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EXAMINER	
SOFOCLEOUS, ALEXANDER	
ART UNIT	**PAPER NUMBER**
2824	

NOTIFICATION DATE	DELIVERY MODE
10/20/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/817,186	BILL ET AL.	
	Examiner	Art Unit	
	ALEXANDER SOFOCLEOUS	2824	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18,20 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *20 and 21* is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the following communication: the Amendment of June 26, 2008.

2. Claims 1-21 are pending in the case. Claim 19 is cancelled. Claims 1, 10, 12, 14, 15, 18, 20, and 21 are currently amended. Claims 1, 10, 14, 15, 18, 20, and 21 are independent claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (U.S. Patent 6,542,400) in view of Oglesby et al. (U.S. Patent 6,656,763).**

Regarding independent claims 1, 10, and 14, Chen et al. teach a memory device comprising:

a backplane (Fig. 1: 12) lying on a substrate (Fig. 1: 20);

a media layer (Fig. 1: 16; which appears to be planar, thus meeting the “planar medium" recited in claim 14) overlying the backplane, comprising an array of selectively conductive memory cells (see Fig. 1: 14 with respect to Fig. 3);

a microactuator assembly (Fig. 3: 60) operative to move a plurality of probes

(Fig. 3: 50) over the memory cells (see Fig. 3) to facilitate memory operations (e.g., read, write; see column 5, lines 35-38).

Chen et al. are silent with respect to utilizing a metal sulfide base media. Chen et al. are also silent with respect to an erase method; however, it is well-known in the art of memory to implement an erase method.

Oglesby et al. teach a metal-sulfide based memory array (see Fig. 1 with respect to column 11, lines 60-65). Oglesby et al. further teach an erase method that may be used with the memory (see column 14, lines 9-19, 26-29). Oglesby et al. additionally teach (limitations from claims 1 and 10) reading, writing, and erasing the memory by applying a bias voltage across the memory cell causing the memory cell to take on a desired impedance state, the impedance state representing the memory cell (see e.g. column 13, lines 57-65; column 14, lines 20-29). Although Oglesby et al. teach a static memory array, the teachings of the Oglesby et al. memory cell may be applied to probe-based memory array environment.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the teachings of Oglesby et al. to the teachings of Chen et al. such that the memory of Chen et al. is replaced with the organic memory (including metal sulfide) of Oglesby et al. for the purpose of providing a memory capable of small sizes, multibit storage, short resistance/impedance switching time, low operating voltages, etc. (see column 2, lines 27-34).

Although the claimed “controllers… for formatting,” or “means for formatting” (claim 10, 21), is not specifically disclosed by Chen et al. or Oglesby et al., it would have

been obvious, if not implicit or inherent, to provide a mechanism to format the layer as it is well-known that a memory must be formatted, or initialized, prior to use.

Regarding dependent claim 2, Chen et al. teach control circuitry (Fig. 3: 66, 60, 62). Chen et al. are silent to the specific term "MEMS."

However, the memory is a molecular-level memory and it would have been obvious to one of ordinary skill in the art to implement the control circuitry using MEMS for the purpose of providing the control circuitry on a similar scale as the memory.

Regarding dependent claim 3, Chen et al. teach the probe may be a non-metallic material or carbon (see column 6, lines 37-39). Chen et al. al further teach that lubricant layer, or a graphite layer, may be used between the prove tips and surface (see column 7, lines 5-7).

Chen et al. silent with respect to using graphite for the probe.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a graphite probe since it is a type carbon (see column 6, lines 37-39) that would be capable of providing lubrication in lieu of, or in further combination with, the graphite layer to reduce friction between the probe and the media, and additionally provide expected and predictable results with respect to the electrical characteristics.

Regarding dependent claims 4 and 5, Oglesby et al. further teach the media is used in conjuction with a polymer selected from one of the group consisting ofpolyacetylene, polyparaphenylene, polythiophene, polypryrrole, and polyaniline, polyphenylacetylene, polydiphenylacetylene (see column 5, lines 14-24).

Regarding dependent claims 6, Chen et al. further teach the probes are scanning tunneling microscopic probes (see column 5, line 66).

Regarding dependent claims 7 and 9, Chen et al. further teach the probes are contacting the media (column 6, lines 64-67), which is a constant distance from the memory cell.

Regarding dependent claim 8, Chen et al. teach the actuator is configured to adjust the position of each probe tip to maintain contact between the probe and the surface of the media (see column 6, lines 64-67).

Although Chen et al. are silent with respect to the specific term "feedback loop," it is well-known in the art to include a feedback loop with scanning tunneling microscopes such that the vertical position of the probe may be adjusted.

Regarding dependent claim 11, Oglesby et al. further teach a plurality of metal sulfide based memory cells (see memory cells at intersection regions of Fig. 1).

Regarding dependent claim 12, Oglesby et al. further teach a plurality of conductivity states (see column 2, lines 28-29).

Regarding dependent claim 13, Chen et al. further teach the memory cell site (see Fig. 3) is determined by the size and motion of the probes (see column 5, lines 53-58).

Regarding independent claim 15, Chen et al. in view of Oglesby et al. teach the metal-sulfide memory as discussed supra claim 1.

Chen et al. further teach positioning the probes over the selected memory cells (see column 5, lines 48-50) and applying voltages to perform operations (see column 5,

lines 53-65);

applying a fixed voltage across a subset of cells (see column 5,lines 53-65); and

determining the impedance of the subset of cells (see column 5, lines 59-65; impedance is an “electrical current [property]”). It is noted that reading the states of the memory of Oglesby et al. is determined by impedance and the programming of the memory appears to be based on impedance states (see column 14, lines 20-26).

Additionally, Chen et al. teach control circuitry (Fig. 3: 66, 60, 62). Chen et al. are silent to the specific term "MEMS."

However, the memory is a molecular-level memory and it would have been obvious to one of ordinary skill in the art to implement the control circuitry using MEMS for the purpose of providing the control circuitry on a similar scale as the memory (as previously indicated supra claim 2).

Regarding dependent claim 16, Chen et al teach analyzing the tunnel current (see column 6, line 22).

Regarding dependent claim 17, Oglesby et al. further teach the memory cell is capable of having multiple states (see column 13, lines 57-65).

It would have been obvious to one of ordinary skill in the art at the time of the invention to compare a read state from the multi-state memory cell against a known, reference, or predetermined value such that the one of many states could be determined.

Regarding independent claim 18, Chen et al. in view of Oglesby et al. teach the metal-sulfide memory as discussed supra claim 1.

Chen et al. further teach positioning the probes over the memory (see Chen et al. column 5, lines 48-50). Oglesby et al. further teach a very low impedance state, low impedance state, medium impedance state, and high impedance state (see Oglesby et al. column 13, lines 57-65). It is implicit that one would need to determine what state to store in the memory prior to storing the state in the memory which would be achieved by applying a threshold across the memory cell (see Chen et al. column 5, lines 53-59; see Oglesby et al. column 14, lines 20-21).

Allowable Subject Matter

5. **Claim 20 and 21 are allowed.**

6. The following is a statement of reasons for the indication of allowable subject matter:

With respect to independent claim 20, there is no teaching, suggestion, or motivation for combination in prior art to a method of erasing a metal sulfide based memory by measuring the impedance of the selected memory cell and applying a threshold voltage to the memory cell such that the resulting impedance corresponds to a determined impedance state representing the memory cell with selected bits erased.

With respect to independent claim 21, there is no teaching, suggestion, or motivation for combination in the prior art to a memory device comprising means for positioning microactuated proves over the selected metal sulfide base memory media to create an array of memory cells, means for applying bias voltage across the memory

cells, means for determining impedance states of the memory cells, means for reading writing or erasing the memory media, and means for formatting the memory media.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

7. Applicant's arguments filed June 26, 2008 have been fully considered but they are not persuasive.

8. Applicant's remarks are acknowledged regarding Oglesby et al. not having motivation to employ a probe-based memory (see Applicant's Remarks page 7, lines 7-8). However, in the combination rejection, it was the motivation of Oglesby et al. for replacing the molecular memory of Chen et al. with the organic memory of Oglesby et al. that was relied upon, not necessarily the motivation of Chen et al. to implement Oglesby et al. organic memory into a probe-based memory.

9. Applicant's remarks are acknowledged regarding a distinction between a metal-sulfide based memory media and a memory media with a passive layer being metal sulfide (see Applicant's Remarks page 7, lines 13-15). The claims under consideration recite "a metal-sulfide based media" and the Office presently interprets this particular

limitation to encompass any memory media that comprises a metal-sulfide. As an additional note, the Oglesby et al. memory appears to have many considerable similarities with that of the instant application (e.g., metal sulfide layers, specific polymers). Presently, under broadest reasonable construction, the Oglesby et al. memory media with metal-sulfide layer appears to meet this limitation.

Thus, in response to applicant's argument that the references fail to show certain features of applicant's invention, it appears that the features upon which applicant relies (i.e., metal sulfide based memory cell wherein the metal sulfide layer is not a passive layer but instead the active layer?) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

10. Applicant's remarks are acknowledged regarding a distinction between each cell being defined by the positioning of a MEMS probe above the memory media and a substantially planar electrode exposed for contact with a probe (see Applicant's Remarks page 7, lines 25-31, page 8, lines 1-3). However, the claims do not appear to presently recite each cell is defined by positioning the MEMS probe above the memory media (the planar memory layer initially has no defined memory cells, and the probes are moved across the media to establish locations to be used as memory cells?).

Thus, in response to applicant's argument that the references fail to show certain features of applicant's invention, it appears that the features upon which applicant relies

(i.e., each memory cell is defined by positioning the MEMS probe above the memory media) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

CONCLUSION

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Krieger et al. (U.S. Patent 6,806,526) and Rust (U.S. Patent 7,233,517).

Krieger et al. show a memory device with passive metal-sulfide layer and polymer layer.

Rust shows a molecular memory for use in a MEMS.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Sofocleous whose telephone number is 571-272-0635. The examiner can normally be reached on M-F 7:00am - 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGS

/VanThu Nguyen/
Primary Examiner, Art Unit 2824